

**ABSTRACT**

Disclosed is a method and system for acquiring absolute temperature imagery using an MR scanner. The method involves using the RF coil as a passive antenna, and performing radiometric measurements of the noise variance of the target within the field of view of the RF coil. The noise variance corresponds to the absolute temperature of the volume within the field of view of the RF coil. The room of the MR scanner is used for electromagnetic shielding during the acquisition of radiometric data. This method may be performed with minimal or no add-ons to existing MR scanner hardware. Disclosed are a method for calibrating an MR scanner for radiometric temperature measurements, and a method for acquiring and generating thermal imagery with a calibrated MR scanner.